UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/441,709	11/16/1999	STEWART GRESTY SMITH	99EDI3175260	4843

27975 7590 02/11/2004

ALLEN, DYER, DOPPELT, MILBRATH & GILCHRIST P.A.
1401 CITRUS CENTER 255 SOUTH ORANGE AVENUE
P.O. BOX 3791
ORLANDO, FL 32802-3791

EXAMINER	
WU, DOROTHY	

ART UNIT	PAPER NUMBER
2615	12

DATE MAILED: 02/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/441,709	SMITH, STEWART GRESTY	
	Examiner	Art Unit	
	Dorothy Wu	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *33-50 and 65-84* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *33-50 and 65-83* is/are rejected.

7)☒ Claim(s) *84* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. Acknowledgement is made of the changes to claim 36, parent of claims 42 and 43. The 35 USC 112, 2nd paragraph rejections of claims 42 and 43 have been rendered moot, and are thus withdrawn. The 35 USC 112, 2nd paragraph rejection of claim 50 has also been withdrawn.

Drawings

2. The drawings were received on October 23, 2003. These drawings are approved.

Specification

3. The substitute, double-spaced specification, received on November 5, 2003, has been entered.

4. The applicant has not provided a double-spaced copy of the abstract.

Response to Arguments

5. Applicant's arguments filed October 27, 2003 have been fully considered but they are not persuasive.

The applicant has argued: "Maruo fails to teach or suggest that the image processing may be applied to a digital video stream." The office respectfully disagrees. Within the claim, the applicant has defined a digital video stream as a series of pixel values corresponding to pixel sites in the electronic imaging system. It is well known in the art that image processing

apparatuses receive image data from pixel sites in a sequential manner, and therefore, Maruo teaches that image processing is applied to a digital video stream. Furthermore, if the applicant then wishes to define a digital video stream as motion images, applicant is reminded that the motion image stream is a set of still images, each of which may be subject to algorithms for processing still images.

The applicant has argued: "Maruo does not mention `in real time' anywhere." However, Maruo teaches that images are captured and processed, which reads on "real time."

The applicant has argued: "Maruo teaches away from correcting/modifying defective pixel values in a video data stream or even in a digital still image." The office respectfully disagrees. Maruo teaches the correction of isolated defective pixels (col. 2, lines 61-65). The detection of an area defect is conducted in addition to the correction of isolated defective pixels.

The applicant has not traversed the "Official Notice" statement in the rejections of claim 44, 49, and 50. Therefore, the subject matter presented by Official Notice is considered to be prior art.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 33 and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Maruo, U.S. Patent 6,163,619.

Regarding claim 33, Maruo teaches a method for processing data in an electronic imaging system (col. 1, lines 6, 16-17), said data comprising a series of pixel values corresponding to pixel sites in the electronic imaging system (col. 1, lines 19-22), which reads on a video data stream, the method comprising the step of filtering the data to identify defective pixels and to correct isolated defective pixels (col. 2, lines 41-44, 61-65), which reads on the step of filtering the data for correcting/modifying defective pixel values in real time.

Regarding claim 34, Maruo teaches median filtering, which reads on a step of filtering that comprises filtering each pixel value based on a plurality of adjacent pixel values (col. 2, line 41).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 35 and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruo, U.S. Patent 6,163,619, in view of Lougheed, U.S. Patent 4,541,116, included in the applicant's Information Disclosure Statement.

Regarding claim 35, Maruo teaches the method of claim 34. See above. Maruo teaches that the step of filtering comprises filtering each pixel value using a current pixel value as part of

a data set including the plurality of adjacent pixel values for determining whether a pixel is a defect and whether additional processing should be applied in addition to the initial filtering step, which reads on the use of the current pixel value as part of a data set of adjacent pixel to determine whether to correct/modify the current pixel value (col. 2, lines 41-65). Maruo does not teach that the current pixel value is part of a data set used to determine how to correct/modify the current pixel value. Lougheed teaches a method for removing noise from an image that uses the current pixel value as part of a data set used to determine how to correct/modify the current pixel value (col. 5, lines 35-47). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the filter of Lougheed into the defect detection and correction method taught by Maruo to make a method of detecting and eliminating isolated noise in a manner that utilizes the current pixel value. One of ordinary skill would have been motivated to make such a modification to remove spot noise from the image signal efficiently.

Regarding claim 82, Maruo teaches an apparatus for processing a data comprising a series of pixel values corresponding to pixel sites, which reads on the video data stream (col. 1, lines 19-22), comprising: an electronic imaging device (CCD) (col. 1, line 38); and a first filter circuit (median filter) for filtering the data stream for correcting/modifying defective pixel values (col. 2, lines 41-44, 61-65), which reads on the first filter value. The sampling circuit for sampling the video data stream to obtain a data set comprising a current pixel value and a plurality of adjacent pixel values for the first filter circuit is inherently taught. Maruo teaches that defective pixels are subject to processing for noise removal (col. 2, lines 61-65). Maruo does not teach the ranking circuit and a comparator for generating a second output. Lougheed teaches a

ranking circuit (rank sorter 38) for sorting the plurality of adjacent pixel values into a rank order based upon predetermined criteria (col. 5, lines 5-9); and a comparator (output selector 36) connected to said ranking circuit for comparing a current pixel value with the plurality of adjacent pixel values of selected ranks, and for generating an output based upon the comparison (col. 5, lines18-22). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the ranking circuit and corrector taught by Lougheed into the defective image detecting apparatus taught by Maruo to make an image sensing apparatus that detects and corrects defects. One of ordinary skill would have been motivated to make such a modification to generate an image of higher quality.

8. Claims 36-43, 47, 65-74, 78, and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruo, U.S. Patent 6,163,619, in view of Lougheed, U.S. Patent 4,541,116, and further in view of Ninomiya et al, U.S. Patent 5,113,246.

Regarding claim 36, Maruo teaches the method according to claim 33. See above. Maruo teaches the steps of filtering non-defective pixels using one technique, median filtering, which reads on the first filtering algorithm, identifying defective pixels, and applying additional processing for correcting defective pixels (col. 2, lines 41-65). Maruo does not teach that the additional processing for correcting defective pixels is a filtering algorithm. Lougheed teaches a filtering process for correcting noise. See above. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the filtering operation taught by Lougheed into the method of detecting and correcting defective pixels taught by Maruo to make an image processing method that filters all pixels to detect defective pixels and filter

identified defective pixels to correct their values. One of ordinary skill would have been motivated to make such a modification to eliminate image noise.

Maruo in view of Lougheed do not teach a memory, nor do Maruo in view of Lougheed teach the step of storing locations of the defective pixel values in the memory. Ninomiya et al does teach a memory (defect memory circuit **25**) used for storing locations of defective pixels (col. 2, lines 65-67). The step of identifying the defective pixels is inherently taught. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the filtering methods taught by Maruo in view of Lougheed with the defect memory circuit taught by Ninomiya et al to make an apparatus that stores locations of defect pixels in memory and uses that information to determine how to filter individual pixels. One of ordinary skill would have been motivated to make such a modification to have a ready means of determining defect pixels and treating them accordingly.

Regarding claim 37, Lougheed teach a filtering algorithm implementing the steps of: sorting the current pixel value and the plurality of adjacent pixel values into a rank order based upon a predetermined criteria; and modifying the current pixel value with respect to its rank in the rank order (col. 5, lines 35-47).

Regarding claim 38, Lougheed teaches a filtering algorithm implementing the steps of: sorting the current pixel value and the plurality of adjacent pixel values into a rank order based upon a predetermined criteria; and modifying the current pixel value with respect to its rank in the rank order (col. 5, lines 35-47).

Regarding claim 39, Lougheed teaches that the current pixel value is modified if its rank is greater than the second highest pixel, which reads on a predetermined maximum rank value, or

less than the second lowest pixel, which reads on a predetermined minimum rank value (col. 5, lines 38-47).

Regarding claim 40, Lougheed teaches a method further comprising replacing the current pixel value by a pixel value having the predetermined maximum rank value if the rank of the current pixel value is greater than the predetermined maximum rank value; replacing the current pixel value by a pixel value having the predetermined minimum rank value if the rank of the current pixel value is less than the predetermined minimum rank value; and leaving the current pixel value unchanged if the current pixel value has a rank less than the predetermined maximum rank value and greater than the predetermined minimum rank value (col. 5, lines 38-47).

Regarding claim 41, Lougheed teaches that the predetermined maximum rank value is a highest ranking of the plurality of adjacent pixel values, and the predetermined minimum rank value is a lowest ranking of the plurality of adjacent pixel values (col. 5, lines 38-47).

Regarding claim 42, Maruo teaches that the determination of a defective pixel is based upon the difference between the original image A and filtered image B, which reads upon the determination being based upon an output of the first filtering algorithm (col. 2, lines 44-65). Ninomiya et al teaches that the locations of the defective pixels are stored in the memory (col. 2, lines 65-67).

Regarding claim 43, Maruo teaches that the determination of a defect is based upon the magnitude of the difference between the original and filtered images, which reads a pixel value being determined to be defective based on a magnitude of a difference between a current pixel value and a pixel value corresponding to the output of the first filtering algorithm (col. 2, lines

44-52). Ninomiya et al teaches that the locations of the defective pixels are stored in the memory (col. 2, lines 65-67).

Regarding claim 47, Ninomiya et al teaches that the difference between the dark voltage and an average voltage are stored in a noise value memory **60**, which reads on the step of storing a defect value corresponding to a magnitude of the defect exhibited by each defective pixel value (col. 5, lines 49-52).

Regarding claim 65, Maruo teaches a method for processing data in an electronic imaging system, said data comprising a series of pixel values corresponding to pixel sites in the electronic imaging system (col. 1, lines 19-22), which reads on a video data stream, the method comprising: filtering the data in real time for correcting/modifying defective pixel values (col. 2, lines 41-44, 61-65), the filtering comprising filtering pixel values using a first filtering algorithm (col. 2, lines 41-42), identifying defective pixel values (col. 2, lines 48-51), and filtering the defective pixel values using a second algorithm (col. 2, lines 60-65). Maruo does not teach that the second algorithm involves filtering. Lougheed teaches a filtering algorithm for removing spot noise. See above. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the filtering algorithm of Lougheed into the apparatus of Maruo to make an image processing apparatus that filters pixels to identify defective pixel values, and then performs additional filtering to correct the defective pixel values. One of ordinary skill would have been motivated to make such a modification to achieve an image of higher quality.

Maruo in view of Lougheed do not teach a memory, nor do Maruo in view of Lougheed teach that the locations of defective pixels are stored in memory. Ninomiya et al does teach a

memory (defect memory circuit **25**) used for storing locations of defective pixels (col. 2, lines 65-67). The step of identifying the defective pixels is inherently taught. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the filtering methods taught by Maruo in view of Lougheed with the defect memory circuit taught by Ninomiya et al to make an apparatus that stores locations of defect pixels in memory and uses that information to determine how to filter individual pixels. One of ordinary skill would have been motivated to make such a modification to have a ready means of determining defect pixels and treating them accordingly.

Regarding claim 66, Maruo teaches median filtering, which reads on a step of filtering that comprises filtering each pixel value based on a plurality of adjacent pixel values (col. 2, line 41).

Regarding claim 67, Maruo teaches that the step of filtering comprises filtering each pixel value using a current pixel value as part of a data set including the plurality of adjacent pixel values for determining whether a pixel is a defect and whether additional processing should be applied in addition to the initial filtering step, which reads on the use of the current pixel value as part of a data set of adjacent pixel to determine whether to correct/modify the current pixel value (col. 2, lines 41-65). Lougheed teaches a method for removing noise from an image that uses the current pixel value as part of a data set used to determine how to correct/modify the current pixel value (col. 5, lines 35-47).

Regarding claim 68, Maruo teaches a median filtering operation, which reads on the filtering of each pixel value being based on a plurality of adjacent pixel values, and the first

filtering algorithm using a current pixel value as part of a data set including the plurality of adjacent pixel values (col. 2, lines 41-42).

Regarding claim 69, Lougheed teach a filtering algorithm implementing the steps of: sorting the current pixel value and the plurality of adjacent pixel values into a rank order based upon a predetermined criteria; and modifying the current pixel value with respect to its rank in the rank order (col. 5, lines 35-47).

Regarding claim 70, Lougheed teaches that the current pixel value is modified if its rank is greater than the second highest pixel, which reads on a predetermined maximum rank value, or less than the second lowest pixel, which reads on a predetermined minimum rank value (col. 5, lines 38-47).

Regarding claim 71, Lougheed teaches a method further comprising replacing the current pixel value by a pixel value having the predetermined maximum rank value if the rank of the current pixel value is greater than the predetermined maximum rank value; replacing the current pixel value by a pixel value having the predetermined minimum rank value if the rank of the current pixel value is less than the predetermined minimum rank value; and leaving the current pixel value unchanged if the current pixel value has a rank less than the predetermined maximum rank value and greater than the predetermined minimum rank value (col. 5, lines 38-47).

Regarding claim 72, Lougheed teaches that the predetermined maximum rank value is a highest ranking of the plurality of adjacent pixel values, and the predetermined minimum rank value is a lowest ranking of the plurality of adjacent pixel values (col. 5, lines 38-47).

Regarding claim 73, Maruo teaches that the determination of a defective pixel is based upon the difference between the original image A and filtered image B, which reads upon the

determination being based upon an output of the first filtering algorithm (col. 2, lines 44-65). Ninomiya et al teaches that the locations of the defective pixels are stored in the memory (col. 2, lines 65-67).

Regarding claim 74, Maruo teaches that the determination of a defect is based upon the magnitude of the difference between the original and filtered images, which reads a pixel value being determined to be defective based on a magnitude of a difference between a current pixel value and a pixel value corresponding to the output of the first filtering algorithm (col. 2, lines 44-52). Ninomiya et al teaches that the locations of the defective pixels are stored in the memory (col. 2, lines 65-67).

Regarding claim 78, Ninomiya et al teaches that the difference between the dark voltage and an average voltage are stored in a noise value memory **60**, which reads on the step of storing a defect value corresponding to a magnitude of the defect exhibited by each defective pixel value (col. 5, lines 49-52).

Regarding claim 83, Maruo in view of Lougheed teaches the apparatus according to claim 82. Maruo teaches the detection of detective pixels based upon the first (median) filter. See above. Maruo in view of Lougheed do not teach a memory connected to said comparator for storing pixel locations selected based upon the an output. Ninomiya et al does teach a memory (defect memory circuit **25**) used for storing locations of defective pixels (col. 2, lines 65-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the memory taught by Ninomiya into the defective image detecting apparatus taught by Maruo in view of Lougheed to make an image sensing apparatus that detects defective pixels, remembers their locations, and corrects them. One of ordinary skill would have

been motivated to make such a modification to only provide additional correction to pixels that need said correction.

9. Claims 44 and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruo, U.S. Patent 6,163,619, in view of Lougheed, U.S. Patent 4,541,116, and further in view of Ninomiya et al, U.S. Patent 5,113,246, and further in view of well-known prior art.

Regarding claim 44, Maruo in view of Lougheed in view of Ninomiya teach the method of claim 43. See above. Maruo in view of Lougheed in view of Ninomiya do not teach that the location of at least one pixel value having a greatest difference in magnitude from the output of the first filtering algorithm is stored in the memory for each frame of video data. However, the examiner takes Official Notice that it is well-known in the art to store the maximum defective pixel value in memory. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to store the greatest defect in memory to assess the variation in error from frame to frame.

Regarding claim 75, Maruo in view of Lougheed in view of Ninomiya teach the method of claim 74. See above. Maruo in view of Lougheed in view of Ninomiya do not teach that the location of at least one pixel value having a greatest difference in magnitude from the output of the first filtering algorithm is stored in the memory for each frame of video data. However, the examiner takes Official Notice that it is well-known in the art to store the maximum defective pixel value in memory. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to store the greatest defect in memory to assess the variation in error from frame to frame.

10. Claims 45-46, 76, and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruo, U.S. Patent 6,163,619, in view of Lougheed, U.S. Patent 4,541,116, in view of Ninomiya et al, U.S. Patent 5,113,246, and further in view of Kaplan, U.S. Patent 4,977,521.

Regarding claim 45, Maruo in view of Lougheed in view of Ninomiya teach the method according to claim 36. See above. Maruo teaches that the filtering of each pixel value is based on the plurality of adjacent pixel values. See above. Maruo in view of Lougheed in view of Ninomiya do not teach that the second filtering algorithm excludes a current pixel value from a data set including the plurality of adjacent pixel values. Kaplan teaches an algorithm that searches the neighborhood of a defective pixel for non-defective pixel values to use in correcting the defective pixel (col. 11, line 67-col. 12, line 8). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the search for and correction by non-defective pixels taught by Kaplan for the second filtering algorithm taught by Maruo in view of Lougheed in view of Ninomiya et al to make a method wherein the defective pixels are corrected by non-defective neighboring pixels. One of ordinary skill would have been motivated to make such a modification to exclude defect noise from the correction calculation to obtain a better correction value for the defect.

Regarding claim 46, Kaplan teaches a filtering algorithm that replaces the current pixel value with a median value of the plurality of adjacent pixel values (col. 12, lines 5-7).

Regarding claim 76, Maruo in view of Lougheed in view of Ninomiya teach the method according to claim 65. See above. Maruo teaches that the filtering of each pixel value is based on the plurality of adjacent pixel values. See above. Maruo in view of Lougheed in view of

Ninomiya do not teach that the second filtering algorithm excludes a current pixel value from a data set including the plurality of adjacent pixel values. Kaplan teaches an algorithm that searches the neighborhood of a defective pixel for non-defective pixel values to use in correcting the defective pixel (col. 11, line 67-col. 12, line 8). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the search for and correction by non-defective pixels taught by Kaplan for the second filtering algorithm taught by Maruo in view of Lougheed in view of Ninomiya et al to make a method wherein the defective pixels are corrected by non-defective neighboring pixels. One of ordinary skill would have been motivated to make such a modification to exclude defect noise from the correction calculation to obtain a better correction value for the defect.

Regarding claim 77, Kaplan teaches a filtering algorithm that replaces the current pixel value with a median value of the plurality of adjacent pixel values (col. 12, lines 5-7).

11. Claims 48 and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruo, U.S. Patent 6,163,619, in view of Lougheed, U.S. Patent 4,541,116, in view of Ninomiya et al, U.S. Patent 5,113,246, and further in view of Watanabe et al, U.S. Patent 5,854,655.

Regarding claim 48, Maruo in view of Lougheed in view of Ninomiya teach the apparatus according to the limitations of claim 47. See above. Maruo in view of Lougheed in view of Ninomiya do not teach the step of updating contents of the memory using a predetermined memory management algorithm. Watanabe et al teaches the storage of positions of defective pixels, and the erasing of the pixel location if the pixel does not attain the abnormal level for a predetermined time, which reads on updating the data corresponding to locations of

defective pixels using a predetermined memory management algorithm (col. 1, line 62 - col. 2, line 6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of considering a pixel normal if it no longer attains abnormal levels taught by Watanabe et al with the apparatus taught by Maruo in view of Lougheed in view of Ninomiya to make an apparatus that updates the contents of memory using a predetermined method. One of ordinary skill would have been motivated to make such a modification to stop correcting pixels if they no longer register defective values.

Regarding claim 79, Maruo in view of Lougheed in view of Ninomiya teach the apparatus according to the limitations of claim 78. See above. Maruo in view of Lougheed in view of Ninomiya do not teach the step of updating contents of the memory using a predetermined memory management algorithm. Watanabe et al teaches the storage of positions of defective pixels, and the erasing of the pixel location if the pixel does not attain the abnormal level for a predetermined time, which reads on updating the data corresponding to locations of defective pixels using a predetermined memory management algorithm (col. 1, line 62 - col. 2, line 6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of considering a pixel normal if it no longer attains abnormal levels taught by Watanabe et al with the apparatus taught by Maruo in view of Lougheed in view of Ninomiya to make an apparatus that updates the contents of memory using a predetermined method. One of ordinary skill would have been motivated to make such a modification to stop correcting pixels if they no longer register defective values.

12. Claims 49 and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruo, U.S. Patent 6,163,619, in view of Lougheed, U.S. Patent 4,541,116, in view of Ninomiya et al, U.S. Patent 5,113,246, in view of Watanabe et al, U.S. Patent 5,854,655, and further in view of Mahant-Shetti et al, U.S. Patent 6,529,238, and well-known prior art.

Regarding claim 49, Maruo in view of Lougheed in view of Ninomiya in view of Watanabe teach a method according to Claim 48. See above. Maruo in view of Lougheed in view of Ninomiya in view of Watanabe do not teach a step of updating the defect value of each defective pixel value based upon an auto-regression function applied to a current pixel value of each defective pixel location stored in the memory, a current output from the second filtering algorithm, and a current stored defect value. Mahant-Shetti et al does teach the step of updating contents in memory that indicate the magnitude of defect for a pixel (col. 7, lines 47-62). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method taught by Maruo in view of Lougheed in view of Ninomiya et al in view of Watanabe et al with the technique of updating memory contents taught by Mahant-Shetti et al to make an image correction method that updates correction values. One of ordinary skill would have been motivated to make such a modification to dynamically compensate for the defects in pixel signals. Maruo in view of Lougheed in view of Ninomiya et al in view of Watanabe et al in view of Mahant-Shetti do not teach an autoregression function to correct the values in memory. The examiner takes Official Notice that it is well-known in the art to use autoregression to update values. It would have been obvious to one of ordinary skill to use a regression function to update defect values in memory to determine if a pixel should still be considered defective.

Regarding claim 80, Maruo in view of Lougheed in view of Ninomiya in view of Watanabe teach a method according to claim 79. See above. Maruo in view of Lougheed in view of Ninomiya in view of Watanabe do not teach a step of updating the defect value of each defective pixel value based upon an auto-regression function applied to a current pixel value of each defective pixel location stored in the memory, a current output from the second filtering algorithm, and a current stored defect value. Mahant-Shetti et al does teach the step of updating contents in memory that indicate the magnitude of defect for a pixel (col. 7, lines 47-62). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the method taught by Maruo in view of Lougheed in view of Ninomiya et al in view of Watanabe et al with the technique of updating memory contents taught by Mahant-Shetti et al to make an image correction method that updates correction values. One of ordinary skill would have been motivated to make such a modification to dynamically compensate for the defects in pixel signals. Maruo in view of Lougheed in view of Ninomiya et al in view of Watanabe et al in view of Mahant-Shetti do not teach an autoregression function to correct the values in memory. The examiner takes Official Notice that it is well-known in the art to use autoregression to update values. It would have been obvious to one of ordinary skill to use a regression function to update defect values in memory to determine if a pixel should still be considered defective.

13. Claims 50 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maruo, U.S. Patent 6,163,619, in view of Lougheed, U.S. Patent 4,541,116, in view of Ninomiya et al, U.S. Patent 5,113,246, and further in view of well-known prior art.

Regarding claim 50, Maruo in view of Lougheed in view of Ninomiya teach the method according to claim 36. See above. Maruo in view of Lougheed in view of Ninomiya et al do not teach that the first and second filtering algorithms are applied to the video data stream in parallel, and a final output pixel value is selected from outputs of the first and second filtering algorithms depending on whether a corresponding pixel location is stored in the memory. The examiner takes Official Notice that it is well-known in the art to multiplex different filtered signals to select the desired data. Therefore, it would have been obvious to one of ordinary skill to multiplex the filtered data streams and select one according to whether it corresponds to a defective pixel.

Regarding claim 81, Maruo in view of Lougheed in view of Ninomiya teach the method according to claim 65. See above. Maruo in view of Lougheed in view of Ninomiya et al do not teach that the first and second filtering algorithms are applied to the video data stream in parallel, and a final output pixel value is selected from outputs of the first and second filtering algorithms depending on whether a corresponding pixel location is stored in the memory. The examiner takes Official Notice that it is well-known in the art to multiplex different filtered signals to select the desired data. Therefore, it would have been obvious to one of ordinary skill to multiplex the filtered data streams and select one according to whether it corresponds to a defective pixel.

Allowable Subject Matter

14. Claim 84 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art does not teach the combination of an electronic imaging device, a first filtering circuit connected to said electronic imaging device for filtering the video data stream in real time for correcting/modifying defective pixel values, a sampling circuit connected to said first filter circuit for sampling the video data to obtain a data set comprising a current pixel value and a plurality of adjacent pixel values; a ranking circuit connected to said sampling circuit for sorting the plurality of adjacent pixel values into a rank order based upon predetermined criteria; a comparator connected to said ranking circuit for comparing a current pixel value with the plurality of adjacent pixel values of selected ranks, and for generating a first filter output; a median circuit connected to said ranking circuit for determining a median value of the plurality of adjacent pixel values and for generating a second output; a memory for storing pixel locations based on the first filter output; and an output circuit connected to said median circuit, said ranking circuit, and said memory for generating a final output pixel value selected from the first and second outputs based upon contents of said memory.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dorothy Wu whose telephone number is 703-305-8412. The examiner can normally be reached on Monday-Friday, 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Christensen can be reached on 703-308-9644. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dorothy Wu

DW
February 6, 2004

ANDREW CHRISTENSEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600